Vocabulary List

Please keep this in your math notebook or folder for easy access in class or when revision. You need to know how to use (read, write and spell) all this vocabulary to do well in Criterion C.

Expression	English
$3 + 6$	3 plus 6 the sum of 3 and 6 add 3 to 6
$5 - 3$	5 minus 3 3 subtracted from 5 (NOTE: different order) the difference between 3 and 5
(6)(8) 6×8	6 times 8 multiply 8 by 6 the product of 8 and 6
7/20	7 divided by 20 divide 7 by 20 (NOTE: what comes after the "by" goes on the bottom) the quotient of 7 and 20
10^2	The square of 10 10 squared 10 to the 2^{nd} power 10 to the power 2
6, 7, 8, 9	These are consecutive numbers because they are in order.
( )	Parentheses Brackets
[]	Square brackets
{}	Curly brackets

Supplementary Exercise --Describing expression in English.

Level 1
Fill in the table.

Expression	English
	Add 5 to 8
$8-3$	
	Multiply 3 by 2
$7\div 4$	
	3 squared
5^4	

Level 2
Fill in the table.

Expression	English
e.g. $(3+4)\times 2$	Multiply the sum of 3 and 4 by 2 Bracket 3 plus 4 times 2
$(9-4)\div 5$	
$\frac{4-6}{3}$	
$(3+4)(4-2)$	
$\frac{2}{7+2}$	

**Level 3
Fill in the table.

Expression	English
	Multiply the sum of the first 2 consecutive even number by 4
$\frac{2+5}{4^2}$	
$\frac{5^4}{3\times 2}$	
$\frac{23^2}{4}\times(3+6)$	

Adding & Subtracting Directed Number using a Number line

Mathematical Form	English Sentence	Example
p	Start by drawing a number line.	Start by drawing a number line.
+x	+x means moving x units to the right from 0.	+6 means moving 6 units to the right from 0.
-x	-x means moving x units to the left from 0.	-6 means moving 6 units to the left from 0.
+y	+y means moving y units up the y-axis from 0.	+6 means moving 6 units up the y-axis from 0.
-y	-y means moving y down the y-axis from 0.	-6 means moving 6 units down the y-axis from 0.
+(+z) (+)(+)=(+)	To add a positive number, I move z units towards the positive direction which brings us to here.	Given +3+(+2). +3 means moving 3 units to the right from 0. To add a positive number, I move 2 units towards the positive direction which brings us to 5.
+(-z) (+)(-)=(-)	To add a negative number, I move z units towards the negative direction which brings us to here.	Given +3+(-2). +3 means moving 3 units to the right from 0. To add a negative number, I move 2 units towards the negative direction which brings us to 1.
-(+z) (-)(+)=(-)	To subtract a positive number, I move z units towards the negative direction which brings us to here.	Given +3-(+2). +3 means moving 3 units to the right from 0. To subtract a positive number, I move 2 units towards the negative direction which brings us to 1.
-(-z) (-)(-)=(+)	To subtract a negative number, I move z units towards the positive direction which brings us to here.	Given +3-(-2). +3 means moving 3 units to the right from 0. To subtract a negative number, I move 2 units towards the positive direction which brings us to 5.

Example 1.1

Find the values of -7-(-4)+(-3)-(+5) by using a number line. Please explain your work step by step using complete sentences.

Solution

Given -7-(-4)+(-3)-(+5). Start by drawing a number line. -7 means moving 7 units to the left of 0. To subtract a negative number, I move 4 units towards the positive direction which brings us to -3. To add a negative number, I move 3 units towards the negative direction which brings us to -6. To subtract a positive number, I move 5 units towards the negative direction which brings us to -11.

Adding & Subtracting Positive & Negative Numbers

Mathematical Form	English Sentence	Example
p	Start with the problem.	Start with 4-(-3).
p->q	Because of this reason, I can make this change, which gives this new equation.	
(-)(-)=(+)	Because two negatives make a positive, I can replace the two negative signs with a plus sign, which gives me this new equation.	Start with 4-(-3). Because two negatives make a positive, I can replace the two negative signs with a plus sign, which gives me 4+3.
(+)(-)=(-)	Because adding a negative is the same as subtracting, I can replace the two different signs with a single subtraction sign, which gives me this new equation.	Start with 7+(-2). Because adding a negative is the same as subtracting, I can replace the two different signs with a single subtraction sign, which gives me 7-2.
(-)(+)=(-)	Because subtracting a positive is just subtracting, I can replace the two different signs with a single subtraction sign, which gives me this new equation.	Start with 4-(+1). Because subtracting a positive is just subtracting, I can replace the two different signs with a single subtraction sign, which gives me 4-1.
(+)(+)=(+)	Because adding a positive is just adding, I can replace the two positive signs with a single plus sign, which gives me this new equation.	Start with 5+(+3). Because adding a positive is just adding, I can replace the two positive signs with a single plus sign, which gives me 5+3.
+	Because ___ plus ___ equals ___, I can replace _____ with ___, which gives me this new equation.	Start with 7+3-2. Because 7 plus 3 equals 10, I can replace 7+3 with 10, which gives me 10-2.
-	Because ___ minus ___ equals ___, I can replace _____ with ___, which gives me this new equation.	Start with 10-2. Because 10 minus 2 equals 8, I can replace 10-2 with 8, which gives me 8.
-x-y	Because both numbers are negative, I add the numbers but keep the sign. Because x plus y equals z, I can replace -x-y with -z, which gives me this new equation.	Start with -7-8+3. Because both numbers are negative, I add the numbers but keep the sign. Because 7 plus 8 equals 15, I can replace -7-8 with -15, which gives me -15+3.
-x+y	Because addition is commutative, I can switch the order, which gives me this new equation.	Start with -15+3. Because addition is commutative, I can switch the order, which gives me 3-15.
small-big	When subtracting a larger number from a smaller one, the result will be negative. Because big minus small equals answer, I can replace small-big with -answer, which gives this new equation.	Start with 3-15. When subtracting a larger number from a smaller one, the result will be negative. Because 15 minus 3 equals 12, I can replace 3-15 with -12, which gives -12.
q	My final answer is the answer.	My final answer is -12.

Example 1.2

Simplify and evaluate -7-(-4)+(-3)-(+5). Please explain your work step by step using complete sentences.

Solution

Start with -7-(-4)+(-3)-(+5). Because two negatives make a positive, I can replace the two negative signs with a plus sign, which gives me -7+4+(-3)-(+5). Because adding a negative is the same as subtracting, I can replace the two different signs with a single subtraction sign, which gives me -7+4-3-(+5). Because subtracting a positive is just subtracting, I can replace the two different signs with a single subtraction sign, which gives me -7+4-3-5. Because both 3 and 5 are negative, I add the numbers but keep the sign. Because 3 plus 5 equals 8, I can replace -3-5 with -8, which gives me -7+4-8. Because addition is commutative, I can switch the order, which gives me 4-7-8. Because 7 plus 8 equals 15, I can replace -7-8 with -15, which gives me 4-15. When subtracting a larger number from a smaller one, the result will be negative. Because 15 minus 4 equals 11, I can replace 4-15 with -11, which gives -11. My final answer is -11.

Mixed Addition and Subtraction of Directed Numbers with Brackets

Mathematical Symbols	English Sentence
( )	Evaluate the values in the bracket and then remove the bracket.
[ ]	Evaluate the values in the square bracket, and then remove the bracket.
{ }	Evaluate the values in the curly bracket, and then remove the bracket.
{[( )]}	Evaluate the values of the expression by removing the brackets inner out. First, the round bracket, then the square bracket. Finally the curly bracket.

Example 1.3

Evaluate 3-(5-3). Please explain your work step by step using complete sentences.

Solution
Evaluate the value of (5-3), and then remove the bracket. Therefore, it becomes 3-2, which is equals to 1.

Example 1.4

Evaluate 3-(3-5). Please explain your work step by step using complete sentences.

Solution
Evaluate the values within the brackets. Therefore the expression would become 3-(-2). Since subtracting a negative number would become plus. So the expression becomes 3+2, which equals to 5.

Example 1.5

Evaluate -10-[3+(-2-1)]. Please explain your work step by step using complete sentences.

Solution
Start with -10-[3+(-2-1)]. Evaluate the values by removing the bracket inner out. First, the round bracket (-2-1), as -2 -1 is the same as -3, the expression becomes -10-[3+ (-3)]. A negative times a positive is negative, so +(-3) is the same as -3. The expression now becomes -10-[3-3]. While 3-3 is a 0, the expression is the same as -10-[0]. Therefore, it is -10.

Alternative: Evaluate the values by removing the bracket inner out. First, the round bracket (-2-1), as -2 -1 is the same as -3, the expression becomes -10-[3+ (-3)]. Since adding a negative number become minus, so +(-3) gives -3. The expression now becomes -10-[3-3]. While 3-3 is a 0, so we have -10-[0], and the answer is -10.

Example 1.6

Evaluate $-[(1+\frac{3}{4})-\frac{5}{6}]$. Please explain your work step by step using complete sentences.

Solution

Start with $-[(1+\frac{3}{4})-\frac{5}{6}]$. Evaluate the values by removing the bracket inner out. First the round bracket $(1+\frac{3}{4})$. To add a 1 and $\frac{3}{4}$, the numbers must have a common denominator. 1 is changed (transformed) into $\frac{4}{4}$. The expressions $1+\frac{3}{4}$ then becomes $\frac{4}{4}+\frac{3}{4}$, which is $\frac{7}{4}$ in total. The expression $-[(1+\frac{3}{4})-\frac{5}{6}]$ becomes $-[\frac{7}{4}-\frac{5}{6}]$. Next, to evaluate $\frac{7}{4}-\frac{5}{6}$, the fractions must be of the same denominator. As 12 is the least common multiple of 4 and 6, we multiply $\frac{3}{3}$ to $\frac{7}{4}$ and $\frac{2}{2}$ to $\frac{5}{6}$. The expression $-[\frac{7}{4}-\frac{5}{6}]$ becomes $-[\frac{21}{12}-\frac{10}{12}]$. While $\frac{21}{12}-\frac{10}{12}$ is the same as $\frac{11}{12}$. The answer is $-\frac{11}{12}$.

Multiplying & Dividing Positive & Negative Numbers

Mathematical Symbols	English Sentence	Example
(-)(-)=(+)	Two negatives make a positive, and ___ times ___ equals ___, so now I have ___.	Start with (-2)(-5). Two negatives make a positive, and 2 times 5 equals 10, so now I have 10.
(+)(-)=(-) (-)(+)=(-)	A negative times a positive is negative, and ___ times ___ equals ___, so now I have ___.	Start with (+4)(-7). A negative times a positive is negative, and 4 times 7 is 28, so now I have -28.
(+)(+)=(+)	Two positives make a positive, and ___ times ___ equals ___, so now I have ___.	Start with (+2)(+5). Two positives make a positive, and 2 times 5 equals 10, so now I have 10.
(-)÷(-)=(+)	Two negatives make a positive, and ___ divided by ___ equals ___, so now I have ___.	Start with (-2)÷(-4). Two negatives make a positive, and 2 divided by 4 equals .5, so now I have .5.
(+)÷(-)=(-) (-)÷(+)=(-)	A negative and a positive make a negative, and ___ divided by ___ equals ___, so now I have ___.	$\frac{4}{-16}$ Start with . A negative and a positive is negative, and 4 divided by 16 is .25, so now I have -.25.
(+)÷(+)=(+)	Two positives make a positive, and ___ divided by ___ equals ___, so now I have ___.	Start with (+8)÷(+2). Two positives make a positive, and 8 times 2 equals 4, so now I have 4.

Example 1.7

Evaluate (-3)(-4). Please explain your work step by step using complete sentences.

Solution

Start with (-3)(-4). Two negatives make a positive, and 3 times 4 equals 12, so now I have 12.